Amendments to the Claims

This listing of claims replaces all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Currently amended): A blood treatment device comprising a blood purification element, divided into two chambers by a semipermeable membrane, whose first chamber is part of a dialysis fluid loop and whose second chamber is part of an extracorporeal blood loop,

a dialysis fluid supply line for supplying fresh dialysis fluid to the first chamber and/or into the blood loop,

a dialysis fluid removal line for removing used dialysis fluid from the first chamber,

a control unit for controlling the blood treatment device,

at least one sensor on at least one of the blood loop or the dialysis fluid loop, the sensor being configured to detect and measure a concentration of a first material capable of penetrating the semipermeable membrane, and

an analysis unit operatively connected to the at least one sensor and configured to determine i) a blood purification performance L1 of the blood purification element for the first material based on the measurement values of the at least one sensor and ii) a blood purification performance L2 of the blood

purification element for a second material, which is different from the blood purification performance L1 for the first material, based on the blood purification performance L1 for the first material.

2. (Previously presented): The blood treatment device according to Claim 1, wherein the blood purification performance L is the effective dialysis Deff.

3. (Currently amended): The blood treatment device according to Claim 2, wherein the analysis unit ~~derives~~ is configured to derive an effective mass exchange coefficient k0A1eff from a measured dialysance D1eff for the first material, ~~determines~~ to determine an effective mass exchange coefficient k0A2eff for the second material from a stored ratio f between a theoretical mass exchange coefficient k0A2th of the second material and a theoretical mass exchange coefficient k0A1th of the first material by multiplying with k0A1eff, and ~~derives~~ to derive an effective dialysance D2eff for the second material from k0A2eff.

4. (Currently amended): The blood treatment device according to Claim 2, wherein the analysis unit ~~derives~~ is configured to derive from a stored theoretical mass exchange coefficient k0A1th for the first material and a stored theoretical mass exchange coefficient k0A2th for the second material, values corresponding thereto for

theoretical dialysances D1th and D2th, and ~~determines~~ to determine an effective dialysance D2eff for the second material from a measured dialysance D1eff for the first material multiplied by a ratio D2th to D1th.

5. (Currently amended): The blood treatment device according to Claim 1, wherein the at least one sensor is a first downstream sensor on the dialysis fluid removal line ~~for measuring~~ and is configured to measure the concentration of the first material in the used dialysis fluid.

6. (Previously presented): The blood treatment device according to Claim 5, further comprising a dialysis fluid preparation unit connected to the control unit.

7. (Currently amended): The blood treatment device according to Claim 6, the analysis unit and the control unit being ~~capable of determining~~ configured to determine the blood purification performance L1 for the first material by a method comprising

storing a concentration C1di1 of the first material in the fresh dialysis fluid in the analysis unit,

measuring a concentration C1do1 of the first material in the used dialysis fluid using the first downstream sensor and storing C1do1 in the analysis unit,

altering a concentration C1di of the first material in the fresh dialysis fluid by the dialysis fluid preparation unit at the command of the control unit,

storing a changed concentration C1di2 of the first material in the fresh dialysis fluid in the analysis unit,

measuring a changed concentration C1do2 of the first material in the used dialysis fluid using the first downstream sensor and storing C1do2 in the analysis unit, and

determining by the analysis unit the blood purification performance L1 on the basis of the concentrations C1di1, C1do1 and changed concentrations C1di2, C1do2 of the first material in the fresh and used dialysis fluid.

8. (Currently amended): The blood treatment device according to Claim 7, wherein the dialysis fluid preparation unit ~~performs~~ is configured to perform the change of the concentration C1di in the form of a step or bolus.

9. (Currently amended): The blood treatment device according to Claim 7, further comprising a first upstream sensor, connected to the analysis unit and located on the dialysis fluid supply line, ~~for measuring~~ that is configured to measure the concentrations C1di1 and C1di2 in the fresh dialysis fluid.

10. (Currently amended): The blood treatment device according to Claim 1, further comprising a second downstream sensor, connected to the analysis unit and located on the dialysis fluid removal line, ~~for measuring~~ that is configured to measure the concentration C2do of the second material in the used dialysis fluid.

11. (Currently amended): The blood treatment device according to Claim 10, wherein the analysis unit ~~determines~~ is configured to determine a concentration C2bi of the second material in the blood flowing to the second chamber based on the measured concentration C2do of the second material in the used dialysis fluid and the stored concentration C2di of the second material in the fresh dialysis fluid and the established blood purification performance L2 of the second material.

12. (Previously presented): The blood treatment device according to Claim 1, wherein the first material is sodium.

13. (Previously presented): The blood treatment device according to Claim 1, wherein the second material is potassium, glucose, creatinine, calcium, or phosphate.

14. (Currently amended) A hemodialysis device comprising:

a blood purification element having a semipermeable membrane, a first chamber connected to a dialysis fluid loop, and a second chamber connected to an extracorporeal blood loop;

a dialysis fluid supply line to supply fresh dialysis fluid to the first chamber and/or into the blood loop;

a dialysis fluid removal line to remove used dialysis fluid from the first chamber;

a control unit to control the hemodialysis device;

a sensor on the dialysis fluid removal line to measure a concentration of a first material in the used dialysis fluid; and

an analysis unit operatively connected to the sensor and configured to determine i) a blood purification performance L1 of the blood purification element for the first material based on the measured concentration, and ii) a blood purification performance L2 of the blood purification element for a second material based on the performance L1 for the first material, the performance L2 being different from the performance L1,

the analysis unit ~~deriving~~ being configured to derive from a stored theoretical mass exchange coefficient k0A1th for the first material and a stored theoretical mass exchange coefficient k0A2th for the second material, values corresponding thereto for theoretical dialysances D1th and D2th, and ~~determining~~ to determine an effective dialysance D2eff for the second material from a

measured dialysance D1eff for the first material multiplied by a ratio D2th to D1th.

15. (Currently amended) A hemodialysis device comprising:

a blood purification element having a semipermeable membrane, a first chamber connected to a dialysis fluid loop, and a second chamber connected to an extracorporeal blood loop;

a dialysis fluid supply line to supply fresh dialysis fluid to the first chamber and/or into the blood loop;

a dialysis fluid removal line to remove used dialysis fluid from the first chamber;

a control unit to control the hemodialysis device;

a sensor on the dialysis fluid removal line to measure a concentration of a first material in the used dialysis fluid; and

an analysis unit operatively connected to the sensor and configured to determine i) a blood purification performance L1 of the blood purification element for the first material based on the measured concentration, and ii) a blood purification performance L2 of the blood purification element for a second material based on the performance L1 for the first material, the performance L2 being different from the performance L1,

the analysis unit ~~deriving~~ being configured to derive an effective mass exchange coefficient k0A1eff from a measured dialysance D1eff for the first material, ~~determining~~ to determine

an effective mass exchange coefficient k0A2eff for the second material from a stored ratio f between a theoretical mass exchange coefficient k0A2th of the second material and a theoretical mass exchange coefficient k0A1th of the first material by multiplying with k0A1eff, and ~~deriving~~ to derive an effective dialysance D2eff for the second material from k0A2eff.

16. (Currently amended) The hemodialysis device according to claim 15, wherein the sensor ~~detects~~ is configured to detect an electrical conductivity of the first material in the used dialysis fluid.

17. (Currently amended) The hemodialysis device according to claim 15, further comprising a second sensor on the dialysis fluid removal line that is configured to measure a concentration of the second material in the used dialysis fluid.